REMARKS

I. Status of the application

Claims 1-31 are pending. Claim 29 has been amended to correct the dependency. No other amendments have been made in this response.

II. Rejection under 35 U.S.C. § 102(b) as anticipated by Suzuki

The Examiner has rejected claims 1-31 under 35 U.S.C. § 102(b) as allegedly being anticipated by Japanese Patent Application No. H8-327728 to Suzuki ("Suzuki"). According to the Examiner, Suzuki discloses the preparation of polyurethane foams from isocyanates and polyols in the presence of water and thermally expandable microspheres. Applicants respectfully traverse this rejection.

Suzuki fails to teach a process for the preparation of a foamed thermoplastic polyurethane carried out in the presence of both microcapsules and an additional blowing agent. In Table 2 on page 11 of Suzuki, Suzuki extrusion molds various thermoplastic urethane elastomers and measures the results in terms of density, surface appearance, and cell structure. In Examples A-D, the thermoplastic urethane elastomers were extruded with Expancel, a thermally expandable microcapsule, without an additional blowing agent. Suzuki reported that for each of Examples A-D, the surface appearance was "good" and the cell structure was "uniform." In contrast to Examples A-D is the Comparative Example. In the Comparative Example, the thermoplastic urethane elastomer was extruded without the presence of microcapsules, but instead in the presence of azodicarboxamide, a chemical foaming or blowing agent. For the Comparative Example, Suzuki reports that surface area appeared "poor, rough" and cell structure was "irregular." Therefore, Suzuki does not use the microcapsules together with an additional blowing agent.

Moreover, when Suzuki uses a blowing agent in place of the capsules—as in the Comparative Example—the results are unsatisfactory. The data in Table 2 thus teaches *against* the use of a blowing agent other than the microcapsules when extruding thermoplastic urethane elastomers. While Suzuki does not run an example using both microcapsules and a blowing agent, one skilled in the art would have no motivation to use such a combination in

view of the results of the Comparative Example, showing the poor results when the additional blowing agent is used.

Additionally, Suzuki does not disclose the use of water in a process for the preparation of foamed thermoplastic urethanes. The only disclosure in Suzuki relating to water is found when Suzuki discusses the prior art references on pages 2-3. But no reference to water is made with regard to Suzuki's disclosed method of making polyurethane resins.

Accordingly, for at least the above reasons, Suzuki does not teach applicants' claimed invention and therefore cannot properly anticipate the applicants' claimed invention. Applicants respectfully request that the Examiner withdraw this present rejection.

III. Rejections over Harrison

The Examiner has rejected claims 1, 2, 4, 7-23, 26, and 27 under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,260,343 to Harrison et al. ("Harrison"), and rejected claims 3, 5, and 6 under 35 U.S.C. § 103(a) as being unpatentable over Harrison. Applicants respectfully traverse these rejections.

Harrison does not teach or suggest a process for preparing thermoplastic polyurethanes. The only disclosure relating to thermoplastics in Harrison occurs with regard to the spheres, in which Harrison discloses a preference for thermoplastic spheres. See col. 7, lines 5-25. However, Harrison neither teaches nor suggests the use of a thermoplastic polyurethane.

A thermoplastic, by definition, is a high polymer that softens when exposed to heat and returns to its Original condition when cooled to room temperature. A thermoset, in contrast, is a high polymer that solidifies or "sets" irreversibly when heated. Thermosetting is associated with the cross-linking or curing of a polymer. Applicants have enclosed page 1093 of Hawley's Condensed Chemical Dictionary, 14th Edition (2001), showing the definition of both "thermoplastic" and "thermoset."

In Harrison, the four samples of Table 1 and the three samples of Table 2 were all cured. See col. 8, lines 56-57 ("The mold was shut, and the contents were allowed to cure.") and col. 10, lines 3-4 ("The foam was removed and allowed to cure."). By using the Polyol C

composition (which comprises the tri-functional reactant trimethylolpropane) in every example, Harrison has introduced an agent that crosslinks with the polyurethane upon cure. Since all the foams disclosed in Harrison have been cured and crosslinked, they are thermoset polyurethane foams; none of the foams disclosed in Harrison can be properly classified as thermoplastic polyurethane foams.

Harrison does not suggest anywhere in its disclosure that thermoplastic polyurethane foams could be prepared in the manner Harrison teaches for thermoset polyurethane foams. And because of the differences in physical properties between thermoplastic and thermoset compositions, one skilled in the art would not infer that a process using thermoset compositions would having any likelihood of success for thermoplastic compositions. Accordingly, since Harrison does not teach or suggest applicants' claimed invention, Applicants respectfully request that the Examiner withdraw the § 102 and § 103 rejections over Harrison.

IV. Conclusion

Applicants believe the application is in condition for allowance and respectfully request early notification to that effect. If for any reason, the application is not yet deemed to be allowable, the Examiner is encouraged to contact the undersigned counsel in order to resolve any remaining issues which may be resolved by a telephonic conference.

Respectfully submitted,

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in household thermometers. Mercury thermometers ranging up to 600C are available; the mercury is prevented from vaporizing by a pressurized inert gas inserted above the mercury column. Metal protection tubes for stem and bulb are necessary. The softening point of the glass is of primary importance; borosilicate glasses are satisfactory up to 500C, but Jena glass is required for higher temperatures. Minimum and maximum thermometers are so made as to retain their lowest and highest readings indefinitely; the latter are used for oil-well and other geothermal measurements.

There are several other types of thermometers: (1) Gas in which either the pressure at constant volume or the volume at constant pressure measure the temperature; these are used for extremely accurate thermodynamic determinations. The gases used are helium, nitrogen, and hydrogen. (2) Bimetallic, in which the sensing element consists of two strips of metals having different expansion coefficients; its range is from −185 to 425C. (3) Thermoelectric (thermocouple), in which measurement is made by the electromotive force generated by two dissimilar metals; its range is from −200 to 1800C. (4) Resistance, in which temperature is measured by change in the electrical resistance of a metal, usually platinum; its range is from −163 to 660C. (5) An optical fiber thermometer developed by NBS Center for Chemical Engineering has a range of up to 2000C. It is made from a single crystalline sapphire and is much more accurate than the existing standard. Based on fundamental radiation principles, it measures thermodynamic temperatures directly. See thermocouple; bimetal.

thermonuclear reaction. See fusion.

thermoplastic. A high polymer that softens when exposed to heat and returns to its original condition when cooled to room temperature. Natural substances that exhibit this behavior are crude rubber and a number of waxes; however, the term is usually applied to synthetics such as polyvinyl chloride, nylons, fluorocarbons, linear polyethylene, polyurethane prepolymer, polystyrene, polypropylene, and cellulosic and acrylic resins.
See thermoset.

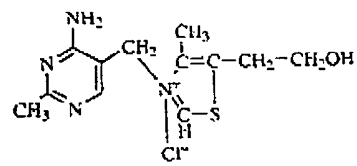
thermoset. A high polymer that solidifies or "sets" irreversibly when heated. This property is usually associated with a cross-linking reaction of the molecular constituents induced by heat or radiation, as with proteins, and in the baking of doughs. In many cases, it is necessary to add "curing" agents such as organic peroxides or (in the case of rubber) sulfur. For example, linear polyethylene can be cross-linked to a thermosetting material by either radiation or chemical reaction. Phenolics, alkyds, amino resins, polyesters, epoxides, and silicones are usually considered to be thermosetting, but the term also applies to materials in which additive-induced cross-linking is possible, e.g., natural rubber.

THF. Abbreviation for tetrahydrofuran.

thia-. Prefix indicating the presence of sulfur in a heterocyclic ring.

thiabendazole. (4-[2-benzimidazolyl]thiazole).
CAS: 148-79-8. $C_{10}H_7N_3S$.
Properties: White to tan crystals. Mp 304C. Slightly soluble in water, alcohols, and chlorinated hydrocarbons; soluble in dimethylformamide.
Use: Fungicide effective on citrus fruits, anthelmintic.

thiamine. (3-(4-amino-2-methylpyrimidyl-5-methyl)-4-methyl-5, β-hydroxy-ethylthiazolium chloride; vitamin B_1). $C_{12}H_{17}ClN_4OS$. The antineuritic vitamin, essential for growth and the prevention of beriberi. It functions in intermediate carbohydrate metabolism in coenzyme form in the decarboxylation of α-keto acids. Deficiency symptoms: emotional hypersensitivity, loss of appetite, susceptibility to fatigue, muscular weakness, and polyneuritis.



Source: Enriched and whole-grain cereals, milk, legumes, meats, yeast. Most of the thiamine commercially available is synthetic.
Use: Medicine, nutrition, enriched flours. Isolated usually as the chloride (see formula above). Available as thiamine hydrochloride and thiamine mononitrate.

1,4-thiazane.

$CH_2SCH_2CH_2NHCH_2$.
Properties: Colorless liquid; pyridine-like odor. Bp 169C (758 mm Hg). Fumes in air. Absorbs carbon dioxide from the air. Soluble in alcohol, benzene, ether, water. Combustible.
Derivation: Interaction of alcoholic ammonia and dichlorodiethyl sulfide.
Grade: Technical.
Use: Organic synthesis.

thiazole.
CAS: 288-47-1.

SCH:NCH:CH.
Properties: Colorless or pale-yellow liquid; odor resembles that of pyridine. D 1.18, bp 116.8C. Soluble in alcohol and ether; slightly soluble in water.
Use: Organic synthesis of fungicides, dyes, and rubber accelerators.